MEDICAL ACCELERATOR PROJECT

Navy Contract Nonr-225(06)

NR 022 166

STATUS REPORT

1 September - 30 November 1953

M.L. Report No. 224

December, 1953

Microwave Laboratory

STANFORD UNIVERSITY

STANFORD, CALIFORNIA

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Contract Nonr-225(06)

1 September 1953 - 30 November 1953

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x - Partial compensation from this contract for work during the period.

DEVELOPMENT OF 6 MEV LINEAR ACCELERATOR FOR MEDICAL AND RADIOGRAPHICAL APPLICATIONS

Status Report
1 September - 30 November 1953

I. INTRODUCTION

During the three months ending 30 November 1953, the development work on a small, compact accelerator, suitable for medical and industrial applications, has continued, with emphasis on the construction of a complete, small accelerator which will check the operation of the gun and buncher, as well as the feasibility of producing a sealed-off accelerator. The last status report described the injection gun and buncher which will be used with this experimental accelerator. In the following sections of this report the coupler and target of the unit will be described briefly.

It should be reported also that the electroforming techniques which were developed with the aid of this contract have been successfully applied to produce a 5 1/2 foot accelerator section which includes the buncher and uniform section in a single unit. This 5 1/2 foot section will be used in the construction of the "medical accelerator" which is the therapeutic x-ray machine being built for Stanford University Hospital.

II. COUPLER

A coupler, which matches the buncher to conventional rectangular waveguide, has been designed and constructed. The

basic design of the unit is similar to that of the couplers used on the Mark III accelerator. The mechanical construction of the coupler is such that the gun can be fastened on one side and the buncher on the other side by gold diffusion seals. A photograph of the coupler is shown on the left in Fig. 3.

III. TARGET FOR X-RAY PRODUCTION

A gold target for converting the kinetic energy of the accelerated electron into x-radiation has been designed. The design provides that the primary electrons strike a gold foil which serves as a vacuum seal at the end of the accelerator. The gold foil, which is purposely made thinner than the range of the primary electrons, is backed by an insulated aluminum electrode where the electrons are stopped and their current is measured.

Fig. 3. Experimental medical accelerator coupler body (left); Electroformed test section of accelerator wave guide (right).

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1 September - 30 November, 1953

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